Hydrotherapy and Water Birth, Sink or Swim?
A review on the safety and efficacy of water therapy practices in labor and delivery units

An Honors Thesis (HONR 499)

By

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Abstract:

Natural birth without medical interventions has been the norm until the last century. As birth became hospitalized, the very way laboring mothers were treated changed. Various aspects of labor and delivery became a safety concern in an effort to improve maternal and fetal outcomes. New practices therefore, must be heavily researched before they can be implemented in these hospital units. Hydrotherapy, though not an entirely new practice, is an upcoming addition to many hospital labor and delivery units. However, this practice is widely controversial as to the safety and efficacy of the practice for both the mother and newborn. In this paper, four main criteria for positive maternal outcomes will be reviewed: duration of labor, perception of pain, degree of perineal laceration, and rate of post-partum infection.

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Hydrotherapy and Water Birth, Sink or Swim? : A review on the safety and efficacy of water therapy practices in labor and delivery units

Labor and delivery is one of the most controversial topics in health care today. There are those practitioners who believe that labor and delivery should be monitored continuously with multiple medical, pharmacological, or technological interventions needed to ensure mother and fetal safety. There are other practitioners, however, that strongly disagree. It is their belief that labor and delivery in a low-risk pregnancy is a safe, natural process that should be treated in that manner. If both the mother and fetus are progressing well, they do not believe in multiple interventions, excessive monitoring, or anything that upsets the natural rhythm of birth. In fact, a review on the use of continuous electronic fetal monitoring declared that there was no significant benefit to the mother and fetus. There was instead, an increased rate of vaginal trauma via episiotomies and cesarean sections (Thacker, Stroup, Chang, 2001).

In recent years, these two schools of thought have been waging a war on the safety and efficacy of certain practices. Multiple reviews and studies have been performed to determine which style of care promotes a safer outcome for low and high-risk pregnancies. However, there is still a debate on several key issues including the use of hydrotherapy in labor and the birthing process. Hydrotherapy is the act of immersion in a body of water by the laboring mother. This immersion is often done in a tub or specialized birthing pools at a birthing center.

In recent years however, many hospitals have begun implementing them into their birthing centers. Mothers now have the option of using these tubs in the hospital, but not everyone agrees on this change. The American College of Obstetricians and Gynecologists recently released a study stating "...the practice of immersion in the second stage of labor

[underwater delivery) should be considered an experimental procedure that only should be performed within the context of an appropriately designed clinical trial with informed consent" (American Academy of Pediatrics, & ACOG, 2014). It is their belief that delivering underwater is still too dangerous and risky to become a widespread practice. Nonetheless, the practice of hydrotherapy has become more popular, but the risks associated with it need to become clearer.

Many of the concerns regarding water births revolve around the efficacy for the mother during the birthing process as well as after delivery in the post-partum stages. It is these risks for which this paper is concerned. In regards to maternal outcomes with hydrotherapy, there are four key issues that were reviewed: duration of labor, perception of pain, degree of perineal laceration, and rate of post-partum infection.

The first key concern is the effect of hydrotherapy on the mother's duration of labor. In order to understand the effects of hydrotherapy on the duration of labor, the normal range needs to be identified. According to The John Hopkins Manual of Gynecology and Obstetrics the normal range of labor is less than 20 hours for the latent phase with an active phase dilation rate of 1.2 cm/hour in a primaparous (first delivery) and less than a 14 hour latent phase with a 1.5 cm/hour dilation rate for a multiparous (more than one delivery) mother (Lawson & Bienstock, 2007). Another factor that may affect the results of a study for this criterion is the stage of labor for which the therapy occurred. Some women choose to use hydrotherapy for only the first stage of labor. This includes dilation of the cervix in latent phase from 0-3cm through active phase with dilation from 3-10 cm. Other women may wish to have a water birth

and utilize a birthing tub during the second stage of labor which includes full dilation to birth of the neonate.

Several articles addressed this issue on the duration of labor. The first article, "The effects of immersion in water on labor, birth and newborn and comparison with epidural analgesia and conventional vaginal delivery" demonstrates that there was actually an increase in the duration of labor for primaparous and multiparous women using hydrotherapy in the first stage. The shortest duration surprisingly occurred in women who delivered vaginally without an epidural or use of hydrotherapy. This change was then contrasted with the second stage of labor. There was a significant decrease in the duration of this stage for those using hydrotherapy (Leyla Mollamahmutoğlu et al., 2012).

The other two articles had varying conclusions. In the article "Effects of water birth on maternal and neonatal outcomes" there were no significant changes. The researchers concluded that "A trend towards a reduction of the length of the first stage of labour was only observed in primaparous women bearing in water, but this reduction did not reach statistical significance ($p > 0.05$)" (Bodner et al., 2002).

In a separate review of 1600 water births, they conclude that "The duration of the first stage of labor was significantly shorter with a water birth than with a land delivery (380 vs. 468 minutes, $P<0.01$)" (Thoeni A, Zech N, Moroder L, & Ploner F, 2005). With the evidence from these studies, it is difficult to say whether there is a decrease or increase in the duration of the first stage of labor. The first article documented an increase for the first stage, while the second and third saw a significant decrease. However, there is a higher possibility that there is a decreased duration of the second stage of labor because of the lack of contradiction.

The second issue that many women endure during labor is pain. In order to have a more enjoyable labor experience, it is essential that women's pain be properly controlled. For many, this is done through intramuscular or intravenous analgesics. Even more women feel that an epidural is the preferred method of pain relief. However, those that wish to use a more natural method without pain medications believe that hydrotherapy is a safer and more preferable alternative. The problem is that the effect of hydrotherapy on actual pain sensation, and women's perceptions of their pain is not yet well known.

Several studies look at pain scores, perceptions of pain, and the neurochemical changes relating to pain during the use of hydrotherapy. One study used Visual Analogue Scales with laboring women using hydrotherapy, birthing stools, and conventional vaginal deliveries. According to the article "The only significant difference noted was that bed births are more painful in the early first stage, and less painful at the end of the second stage...Women who choose bed births are significantly less likely than others to have an analgesic-free birth. For primaparous [mothers] there is also a small but significant difference showing that water births are less likely to require analgesics compared to Maia stool births" (Eberhard J, Stein S, & Geissbuehler V, 2005). This means that those using water immersion, compared to other methods, had a significant decrease in pain and the need for analgesics during early labor.

In a very different approach "Women's experience of water birth," a qualitative study was completed on women using water births in five birthing centers. This study focused on key ideas expressed by women through a questionnaire about their experience. The author determined that laboring women "particularly liked the relaxing calming quality of the water... Women's responses to the survey suggested that mothers perceived water birth as

therapeutic" (Richmond H, 2003). Women's perceptions of their experience were very positive for water births and that reflects on the overall usefulness of the therapy. If they believe it was therapeutic, then it should be considered as such.

Another study looked at the actual neurochemical reactions in the pain center of the brain during labor. The study hoped to discover that there was an actual difference in the reactions of the brain. The study focused on the neurotransmitter associated with pain, cortisol. The researchers found, "There were no significant differences between preimmersion and immersion pain or cortisol (C) levels. Pain decreased more for women with high baseline pain than for women with low baseline levels at 15 and 45 min" (Benfield et al., 2010). This is where the studies differ. While the studies utilizing pain scores and testimonies found a change in the level of pain for women using hydrotherapy, there was no statistical difference in the pain receptor activity when studying the neurochemicals. However, these studies did observe changes in pain levels for women experiencing high levels of pain and concluded that this method was therapeutic for reducing high to moderate pain levels.

The third issue that faces women in labor is the fear of perineal laceration. According to Mayo Clinic, there are varying degrees of laceration that can occur during labor. First degree lacerations occur when there is a tear that only affects the tissue surrounding the vagina. A second degree laceration involves tearing of the vaginal tissue and perineal muscle. Third degree tears include all of the vaginal tissue and muscle around the anus. The final degree, fourth degree, is the most severe and involves tearing the tissues clear into the tissue lining the rectum (Mayo Clinic, 2014). Often to prevent these lacerations, the physician will make an incision called an episiotomy that creates a larger opening for the fetus to pass through. This is

thought to be better than allowing the perineum to tear on its own. The physician can easily stitch the straight incision. Others disagree with this method. They believe that it is only a matter of convenience for the physician and should not be performed. They also believe that there are ways to ensure stretching of the perineum does not result in a tear. Hydrotherapy is one of those methods.

The use of a water tub during labor is thought to soften the perineum (Perry, Hockenberry, Lowdermilk, & Wilson, 2014). This softening allows the perineum to stretch rather than tear when the fetus is exiting the birth canal. Several articles and studies have looked at the different degrees of laceration in women using hydrotherapy versus those that deliver vaginally without it. One article concluded that, "A statistically significant lower rate of episiotomies ($p = 0.0001$) and vaginal trauma ($p = 0.03$) was detected in the group assigned to water birth" (Bodner et al., 2002). However, no specification as to the degrees of vaginal trauma was noted.

Another article determined that there were differences between women who used a birthing stool, water birth, and bed birth. The researchers of "Waterbirths: a comparative study" stated that "An episiotomy was performed in only 12.8% of the births in water, in 27.7% of the births on the Maia-birthing stool and in 35.4% of the bedbirths. These differences are statistically significant. In spite of the highest episiotomy rates, the bedbirths also show the highest 3rd- and 4th-degree laceration rates (4.1%), thus the difference between the rates for bedbirths and alternative birth methods for severe lacerations is significant" (Geissbühler V & Eberhard J, 2000). This means that water births had both a lower rate for episiotomy and a lower rate of high degree lacerations. In addition, the article contradicts the belief that an

episiotomy protects women from having higher degree tears because there was actually an increase in degree of tear with episiotomy.

In agreement with this study, another noted that primaparous women using hydrotherapy had fewer episiotomies, but more second degree lacerations than women who did not use hydrotherapy. In spite of more second degree lacerations, there was no change in the amount of high degree lacerations between women using, and not using hydrotherapy (Henderson et al., 2013). This study just reinforces the concept that hydrotherapy leads to fewer episiotomies and thus fewer high degree tears. Overall, there is evidence from these articles to support that there is a decrease in the need for episiotomies with reduced or no change in the degree of lacerations in women using water immersion therapy.

The fourth and final issue against water birth is perhaps the most widely disputed. The risk for infection is perhaps one of the biggest concerns that most physicians raise when discussing this therapy. In a tub, there is a possibility for bacterial growth. Since the water is moving around in the tub and the vagina is exposed, bacteria can enter the vagina and infect any tissue, muscle, or organ of the birth canal, especially in lacerations and open wounds surrounding the perineum. Infections in perineal wounds can cause significant risk to the mother and inhibit any healing that should be taking place. Those for hydrotherapy say that the risk for infection is no greater for women using tubs than delivering in a hospital bed.

Several studies were completed regarding the infection rates of women delivering vaginally in a hospital bed versus a birthing tub. A previously mentioned study discovered that maternal infection rate ($p = 0.03$) was significantly lower for women who utilized hydrotherapy

than those that did not (Bodner et al., 2002). Rather than increasing, the infection rates had decreased, contradictory to many practitioners' opinions.

Another study had similar conclusions. According to the article "Maternal and neonatal infections and obstetrical outcome in water birth," the researchers concluded that "There was no maternal infection related to water birth" (Zanetti-Daellenbach et al., 2007). Although this study did not have as many cases to review and is therefore not considered significant or generalizable, the lack of infection in any of the laboring mothers still indicates that the risk for infection is not as prevalent as was once believed.

Along with these articles, there is even more support that the rates and risks for infection are decreased or similar to those of vaginal deliveries without hydrotherapy. Stringer and Hanes' review states "These studies found that there was no difference in maternal and neonatal morbidity such as infections between bathers and nonbathers" (Stringer & Hanes, 1999). While this study is older, it reveals that even as early as fifteen years ago there was support to indicate that water births were safe. There appears to be no increased risk for infection for women using this therapy and therefore, there should be no restrictions in using it based on these outcomes.

Over the years, physicians, hospitals, and associations have questioned the safety and efficacy of using hydrotherapy or performing water births. Issues were raised concerning the outcomes of both the mother and fetus. While many arguments revolve around the fetus, just as many erupt over maternal outcomes. In order to determine the safety and efficacy of this practice, many reviews, studies, and research trials were performed.

Four main criteria highlight the issues raised by these groups: duration of labor, perception of pain, degree of perineal laceration, and rate of post-partum infection. After reviewing several studies, conclusions can be drawn regarding these issues. First, the use of hydrotherapy or water births appears to be a safe practice for mothers.

Secondly, the use of hydrotherapy may be beneficial to the mother during the laboring process. There were numerous studies that showed a decrease in the duration of the first and second stages of labor, a decrease in the need for pain medication and altered perceptions of pain, a decrease in episiotomies and high degree perineal tears, and no significant change in the rate of post-partum infection. Whatever misgivings a practitioner may have, they may rest assured that the use of hydrotherapy and the practice of water births is supported by literature as being a safe and beneficial alternative for low-risk, laboring women. While the safety and efficacy for the fetus was not reviewed in this paper, low-risk, pregnant women should feel more confident that the choice to utilize hydrotherapy or have a water birth can lead to a safe and positive experience.

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